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ROGERS PASS GRADE IMPROVEMENT

A Brief Related to Terrain and Hydrology Impacts

and

Other Environmental Issues

Prepared for:

Rogers Pass Environmental Panel

Prepared by:

Larry E. Hurwitz, P.Eng.

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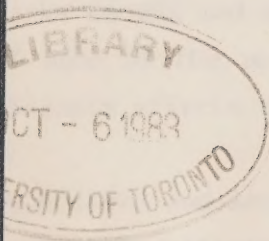
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Calgary Hearings

Calgary, Alberta

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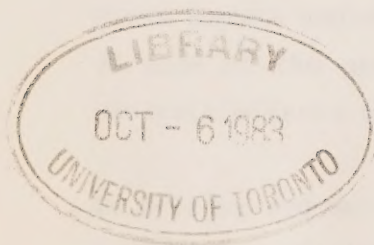
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INTRODUCTION

CP Rail has received approval from the Canadian Transport Commission to double track and improve the grade requirements of its main line from Rogers to Cougar Creek, B.C. This massive project includes 14.5 km tunnel through Mount MacDonald and Cheops Mountain; a 1.6 km tunnel under the TransCanada Highway; nine new bridge structures; and 17.7 km of new surface grade in varying cut and fill, a 35 kV powerline, a ventilation building and shaft, three work camps and 4.7 km of double tracking. It will require six years to complete and will cost about \$600 million. Work has already begun. In 1982, construction work included clearing and grubbing of the surface route, construction of access roads, construction of the West Portal of the Rogers Pass Tunnel and preliminary works at the East Portal. Preliminary work will continue in 1983, but major construction contracts for tunnel excavation, grade construction, bridges and retaining walls will be awarded by March, 1984. Scheduled start-up of operations is November 1, 1988.

GENERAL ENVIRONMENTAL ISSUES

We are of the opinion that the environmental process to date has progressed satisfactorily. The Rogers Pass Environmental Hearings in the spring of 1982 raised some valid concerns, and CP Rail and its consultants have produced some excellent work in response to those concerns in the ensuing months. However, it is evident that Parks Canada and others still have concerns about the effectiveness of some of the proposed environmental mitigative measures and the ultimate effects of the project on Glacier National Park.

We believe and sense from others, the concern stems mainly from the lack of specificity of environmental controls and commitment. This is not condemnation of CP Rail. In fact, production of the red



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book entitled "Rogers Pass Project: Submittal to Federal Environmental Assessment Review Office, June, 1983" goes a long way towards fulfilling commitments and detailing environmental measures and controls. Most importantly, it demonstrates CP Rails willingness to make such commitments and in itself is testimony to CP Rails recognition that such a document was needed.

One area of some concern to us is the relative impression of the effectiveness of restoration techniques of major terrain disturbances. For example, CP Rail on the one hand cites restoration at the Big Cut at Lake Louise as an example of what can be done, while others cite it as an example of unsuccessful restoration. Again what is missing is an agreed or specific definition of what constitutes success or failure. A specification such as "restoration shall be deemed successful once 75 percent ground cover is established over 90 percent of the area that can reasonably be expected to be revegetated," would at least bring the problem into quantitative rather than qualitative terms.

Another area of concern to us is that either CP paints "too rosy" a picture of the aesthetic qualities of post-construction right-of-way conditions or Parks Canada's expectations are too high. Probably the true picture is somewhere in between. However, we believe some problems are created by overly optimistic presentations that raise expectations. As an example, the Visual Impact Assessment Report using the computer graphic photomontage simulation technique is a genuine attempt to aid Parks Canada and others to visualize the terrain impacts and their effects on aesthetics. However the use of black ink and dark color shades for overlay unintentionally obscures the real picture. In summer and for sure in winter with snowcover, denuded cuts and fills will appear in much lighter colors than the surroundings. The overlay we have prepared accentuates the problem. Unless Parks Canada realizes at this time the

vividness of color contrasts caused by exposed terrain impacts as will be seen from the TransCanada Highway they are bound to be disappointed with the end product regardless of CP Rails good efforts to mitigate it.

Other visual realities pertain to car passengers farthest from the new grade (that is, the drivers side in west bound vehicles and the passenger side on east bound vehicles). They will focus directly on the new disturbance in many locations. This is a result of mountain tops being blocked by the interior roof lines, valley bottoms being blocked by the interior door lines, and the cross-valley view from the TransCanada Highway being the only side view available.

Environmental inspection is also a concern to us. It is not reasonable to expect one Environmental Coordinator can inspect all construction activities. Crisis type problems alone will occupy the Environmental Coordinator almost full time. Should construction involve two and possibly even three work shifts, one environmental inspector would be run off his feet. Our experience with environmental inspection is that an independent environmental inspector should be available for each concentrated work front (eg. bridge construction, cut and fill, tunnels, etc.). The Environmental Coordinator should oversee the environmental inspectors and be available for crisis situations. The right of "job shut-down" must be available to the Environmental Coordinator if the environmental inspectors are to play a significant role in project control. We do not think CP Rail should necessarily be burdened with the cost of such inspection, but that Parks Canada has responsibility to protect the Park.

Training of Contractors and their workers about environmental matters and continual reminders of the need for environment protection will be required if CP Rail commitments to environment protection are to be realized. The soft-sell approach to workers seems to be most effective in our experience, because otherwise workers tend to try "to beat the system or to pull one over on inspectors."

A sense of team effort to protect the environment where workers control themselves is the preferred method.

Irrespective of environmental inspection and engineering and/or environmental specifications, Murphy's Law will apply: If something can go wrong, it will go wrong! Slides during construction or the need to waste wet materials will almost surely arise. Just as at Lake Louise, unforeseen problems will necessitate requests for deviations from plans and such requests should be anticipated.

A mechanism to deal with such problems should be left in place by the Panel. We also envision a need for an annual independent inspection of the project. These two needs could be filled by the existing Panel, but we understand FEARO Panels disband after submitting their final report. Therefore, we recommend that the Environmental Committee continue until 3 years after completion of the project to fulfill a continuing and post construction inspection review.

HYDROLOGY

Work on hydrology has progressed significantly in the past year. Design criteria have been established and site specific recommendations have been made for major creeks to be crossed. Designs have been influenced by both hydraulic and debris flow estimates. In general, flow estimates were found to be conservative for design purposes. Over-design is justified in the terrain encountered,

particularly since flow runoff records do not exist for the streams to be crossed. Where records of streamflow do exist for rivers or streams in the region they are either of short duration or for much larger drainage areas. Therefore, we agree with the conservative approach taken. However, on the other hand, over-design will result in extra training works and guide banks that will add to aesthetic costs. There is still a need for further details related to training works and guide banks including aesthetic assessment.

At least two potential problems remain and another problem already exists: capacity of temporary bridges; what to do with Cedar Creek; and, siltation downstream of existing and future terrain disturbances. The capacity of temporary bridges has been a concern; however, all are now in place although the one over Mountain Creek was threatened this spring. Because they are already in place, there is no reason to replace any that may be under capacity until necessitated by washout should that occur. To upgrade at this time would probably cause as much environmental damage as washout and replacement. Therefore, we recommend no action be taken at this time on temporary bridges, except maintenance.

What to do with Cedar Creek seems to be an unresolved problem. The creek must be dropped about 12 m (40 ft.) to pass beneath a 9 m (30 ft.) cut. CP Rail had proposed diverting it to the west from the top of the debris cone, but Parks Canada has opposed this. CP Rail then began looking at a diversion to the east - possibly not realizing it was the diversion Parks Canada opposed and not whether it was on the west or east side of the debris cone. Parks Canada objective is to maintain streams in their natural state to the extent possible. However, diversion to the east has its drawbacks involving a right angle turn, location of the diversion channel in a side hill cut, and substantially more clearing and excavation than the diversion to the west. It now appears other options are

being considered. We are not clear on the nature of options being considered, and therefore are not in a position to make specific recommendations.

Although our earlier preference was with a drop structure, the anticipated design flow was lower than has been recommended. Because the existing channel capacity appears to be much below the new design capacity, major channelization would be required and it would have to extend up the debris cone to where the channel capacity equalled or exceeded design capacity. Otherwise control of the stream would be lost. Debris flows and their effects on hydraulic capacity are an added complication for the design at Cedar Creek.

A solution limiting terrain disturbance to or near the railway right-of-way would be preferred environmentally. However, this may not be practical or achievable in this case. If channelization and/or diversion is necessary, access should use numerous switchbacks, and clearing for channelization and construction of flumes or other engineering works should use strip cutting in order to minimize aesthetic impacts. A detailed plan should be submitted to the Environmental Committee for approval.

The existing problem relates to siltation of streams, stemming largely from the fill material of the temporary access road (and in future from the new railway grade) washing directly into streams. Other major projects such as pipelines and mine developments (often just on Crown land) are required to meet certain standards through the use of sediment traps. Visual monitoring has been proposed by CP Rail. However, a more specific standard is needed and we suggest the mining standard should apply:

Total Suspended Solids: 50 milligrams/litre Max. Absolute or 10 milligrams/litre Max. above the natural background concentration whichever is greater.

Natural background concentration should be measured immediately upstream of terrain disturbances for comparison to concentrations within 100 m downstream of the disturbance.

CP Rail is committed to limiting tunnel effluent to 60 ppm (mg/l) or 10 ppm above receiving body concentration, whichever is greater. Such effluent flows are normally diluted by stream flows. Therefore, limiting streamflow suspended solids concentrations to 50 mg/l or 10 mg/l above natural background concentration is not unreasonable. This stipulation will require periodic (minimum twice weekly) monitoring both upstream and downstream and may result in the need for sediment traps, revegetation of temporary fills, and use of the natural forest cover for filtering sediment out of drainage flows.

Another concern relates to CP Rails commitment towards slope stabilization, temporary bridge removal and reclamation in the event the Crow Rate controversy delays or suspends present construction plans. We believe this possibility must be addressed by both CP Rail and the Panel.

Finally, our last general concern relates to spending dollars committed to environmental enhancement or protection in an efficient manner. As an example, we do not in general find rock cuts offensive and view attempts at their reclamation as inefficient and unnecessary. Therefore, we would eliminate hydroseeding rock cuts as well as the proposed use of dark asphalt tackifier.

TERRAIN

In our correspondence of 27 April 1983 to the Panel, we raised certain points requiring clarification in respect of the proposed plans of CP Rail. These were addressed under the headings: right-of-way; borrow materials; drainage; hydrology; and tunnel wastewater treatment. The CP Rail June 1983 submission has responded to most of our queries in an effective manner and we would at this time briefly recapitulate for the Panel.

Right-of-Way

We had requested the area of right-of-way which would be required and its relationship to the 60 m (200 ft.) approved by the CTC. In the red book, CP Rail has indicated a variable width of right-of-way which will occupy 150 ha (371 acres) of park lands, although that total amount will not be cleared. We have attempted to rationalize these numbers and have calculated the average width of right-of-way to be 98 m (323 ft.), with about 47 m (156 ft.) cleared. It is not readily apparent why the right-of-way is double the cleared width and perhaps CP Rail could comment.

We also had asked what alternatives had been considered in locations of major cuts and fills which might reduce right-of-way width requirements. CP Rail has described the design considerations in fair detail (pp. 31-36 of red book). Retaining structures were considered in many instances to reduce fill requirements but were deemed unfeasible due to stability and construction problems in the steep terrain, and the high loads for which they would have to be designed. While these are reasonable statements, it would appear that certain fills in the section between Sta. 294+00 and 384+00 might be reduced with the use of walls no higher than that presently in place at the east portal of the main tunnel. There would likely be a cost premium but it might be possible to save 30

m (100 ft.) or more of clearing in certain locations. Possibly CP Rail could elaborate somewhat for their decision to use fills.

Borrow Materials

We had expressed concern about the disposal or wasting of materials from the grade in the event that seepage or rainy weather made them too wet to be placed in fills. There are many references throughout the CP Rail red book which acknowledge their concern and the direction they will follow. In general terms, we are satisfied that they are aware of the problem. However, we recommend to the Panel that they leave in place a mechanism which will ensure that Parks Canada have input and/or review of contract documents prior to tender. In our opinion, the grade construction operation must be spelled out carefully and completely in contract documents so that contractors will know where materials can be disposed and so forth, in the event of wasting. Otherwise, pressure will be brought to bear on Parks Canada to relax specifications in order to expedite construction.

Drainage

We had requested plans of the drainage flumes which may be implemented to control water at the Griffith, Unnamed and Wet landslide areas. Although we have not seen plans, the description of such measures provided by CP Rail (pp. 42-44 of red book) would suggest that considerable thought has been given to the drainage works. The only question we would ask is whether the area they might occupy is included in the tabulation of cleared area on p. 49 and, if not, what would be the additional area requiring clearing.

Hydrology

We had requested information on the design of training dykes or guide banks proposed at certain of the stream crossings. CP Rail has indicated that it is still their intent to employ the dyking and we would ask some clarification as to the material source, in particular, whether it will be taken from the streams. We would also ask whether the cleared area on p. 49 includes these facilities and, if not, what will it be.

The subject of Cedar Creek has been dealt with previously in this presentation.

Tunnel Wastewater Treatment

We had asked what method of treatment of tunnel wastewater would be undertaken by CP Rail. The red book has indicated that settling ponds with oil skimmers will be used, and locations satisfactory to Parks Canada have been selected. We have no further concerns on this issue.

